

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1, 3, 4, 6-9, 12-18, and 20-28 are pending in this application. Claims 2 and 19 are canceled by the present response without prejudice and Claims 27 and 28 are added by the present response. Claims 14 and 15 stand withdrawn from consideration. Claims 2 and 19 were rejected under 35 U.S.C. § 112, second paragraph. Claims 1-4, 7-9, 12, 13, 16-19, and 21-25 were rejected under 35 U.S.C. § 103(a) as unpatentable over JP 11-135774 to Anthony et al. (herein "Anthony") in view of Applicants' attachment to Paper 19 filed June 6, 2003, or M.R. Visokay et al. (herein "Visokay"). Claims 6 and 20 were rejected under 35 U.S.C. § 103(a) as unpatentable over Anthony, Applicants' attachment and Visokay as applied to Claims 1 and 16, and further in view of U.S. patent 6,544,875 to Wilk. Claim 26 was rejected under 35 U.S.C. § 103(a) as unpatentable over Anthony, Applicants' attachment and Visokay as applied to Claim 16, and further in view of U.S. patent 5,818,092 to Bai et al. (herein "Bai").

Applicants reviewed the present specification and corrected recognized minor errors in the specification. The changes made to the specification are deemed to be self-evident from the original disclosure, and thus are not deemed to raise any issues of new matter.

A new Title is submitted herein as suggested in paragraph 4 of the Office Action.

Addressing now the rejection to Claims 2 and 19 under 35 U.S.C. § 112, second paragraph, that rejection is obviated by the present response as Claims 2 and 19 are canceled by the present response.

Addressing now each of the outstanding art rejections based on Anthony in view of Applicants' attachment or Visokay, and further in view of Wilk or Bai, those rejections are traversed by the present response.

Independent claim 1 positively recites “a particle diameter of said nano-crystals being within a range of between 1 nm and 10 nm”. Independent claim 16 recites similar features. Applicants submit that feature is neither taught nor suggested by the applied art.

With respect to the above-noted feature the Office Action recognizes that Anthony does not explicitly disclose the particle diameter of the crystals. To address that deficiency in Anthony the outstanding Office Action states:

However, Anthony clearly teaches that the silicate 36 is subjected to a high temperature anneal to densify or *crystallize* (page 28, lines 5-7). Additionally, Applicant Attachment (Fig. (a)) and Visokay (Fig. 3b) disclose the diameter of the crystals of the insulating film to be within the claimed range (1 nm - 10 nm).¹

With respect to the above-noted basis for the outstanding rejection, applicants first note that Anthony only discloses that a silicate 36 is subjected to a high temperature anneal to densify or crystallize that silicate. Applicants note that the annealing temperature described in Anthony is 750°C, at which nano-crystals having a particle diameter within a range between 1 nm and 10 nm cannot be obtained. As noted in the present specification at page 36, line 15, to page 37, line 1, by applying an annealing treatment at an atmospheric pressure and a temperature falling within a range of between 800°C and 1000°C nano-crystals can be formed. The temperature of annealing of 750°C as disclosed by Anthony is not believed to result in forming nano-crystals.

It is also noted that at no point does Anthony disclose or suggest forming nano-crystals, and merely because Anthony discloses crystallizing the silicate 36 does not indicate the formation of nano-crystals.

Accordingly, applicants respectfully submit it is clear that Anthony is not directed to and does not teach or suggest forming nano-crystals. In Anthony densification or crystallization is performed in a general manner to obtain a structure such as shown for

¹ Office Action of August 15, 2003, page 4, lines 12-15. [Original Emphasis].

example in Figure 1 of the present specification. However, Anthony does not give any consideration to such a structure nor provide any description of a structure such as in the claimed invention. In Anthony the highly dielectric metal oxide thin film should contain a boundary region referred to as a “grain boundary” formed by colliding crystal grains with each other.

In contrast to Anthony, the insulating film as recited in the claims contains nanocrystals, and does not contain a grain boundary, see for example Figure 11 in the present specification. More specifically, the claimed insulating film has a structure having nanocrystals, which as a non-limiting example may be embedded within an amorphous substance, which clearly differs from the structure in Anthony.

Moreover, no teachings in Applicants’ attachment or Visokay can overcome the deficiencies in Anthony.

The attachment provided to Paper 19 merely shows effects of nitrogen concentration on crystallization. More specifically, crystallization occurs when annealing is performed at 1000°C in the absence of nitrogen. However, such teachings are completely irrelevant to Anthony as Anthony does not disclose or suggest that annealing is performed at 1000°C.

Stated another way, as Anthony discloses performing an annealing at 750°C, an indication of what structure would result from annealing at 1000°C is completely irrelevant to the teachings in Anthony. Thus, no combination of teachings of Anthony in view of Applicants’ attachment would render obvious the claimed features.

Moreover, Visokay has a publication date of April 29, 2002, which is subsequent to the filing date of June 26, 2001, of the present application, and thus the teachings in Visokay cannot be applied against the currently pending claims.

In such ways, no combination of teachings of Anthony in view of the noted Applicant’s attachment or Visokay renders obvious the currently pending claims.

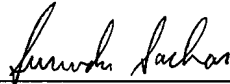
Moreover, no teachings in the further applied references to Wilk or Bai are cited with respect to the above-noted features and no teachings in Wilk or Bai can overcome the above-noted deficiencies of the relied upon combination of teachings.

In such ways, each of independent Claims 1 and 16, and the claims dependent therefrom, are believed to distinguish over the applied art.

As no other issues are pending in this application, it is respectfully submitted that the present application is now in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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